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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,208	03/22/2004	Yoshinori Kumura	250834US2S	9142

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EXAMINER

PHAM, HOAI V

ART UNIT PAPER NUMBER

2814

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/805,208

Applicant(s)

KUMURA ET AL.

Examiner

Hoai v. Pham

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 8-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-8 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 22 March 2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-8 in the reply filed on 12/06/2004 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 4, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawahara et al. [U.S. Pat. 6,101,085].

With respect to claim 1, Kawahara et al. (figs. 29-31, cols. 19-21) discloses a ferro-electric memory device comprising:

a semiconductor substrate (1);
a first transistor (see fig. 29) formed on the semiconductor substrate (1); and
a first ferro-electric capacitor electrically connected to the first transistor and formed of a first capacitor material layer having a first lower electrode (65), a first ferro-electric film (64), and a first upper electrode (63), the first ferro-electric capacitor being thicker at its central portion than at its ends (see fig. 31).

With respect to claim 2, Kawahara et al. discloses that the first ferro-electric capacitor has a bowl shape with a curved top surface (see fig. 31).

With respect to claim 4, Kawahara et al. discloses that the first lower electrode (65) is formed of a material (Ru) having an oxygen diffusion prevention effect (see col. 19, lines 60-63).

With respect to claim 8, Kawahara et al. discloses that the first ferro-electric capacitor is conical (see fig. 29).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahara et al. [U.S. Pat. 6,101,085] in view of Jacob et al. [U.S. 6,724,026].

With respect to claim 5, Kawahara et al. further discloses a second transistor (see fig. 29) formed on the semiconductor substrate (1); and a second ferro-electric capacitor electrically connected to the second transistor and formed of a second capacitor material layer having a second lower electrode (65), a first ferro-electric film (64), and a second upper electrode (63), the second ferro-electric capacitor being thicker at its central portion than at its ends (see fig. 31).

Kawahara et al. does not disclose wherein a first cell in which the first upper electrode and the first lower electrode are electrically connected in parallel with first sources/drains of the first transistor is electrically connected in series with a second cell in which the second upper electrode and the second lower electrode are electrically connected in parallel with second sources/drains the second transistor.

However, Jacob et al. discloses that it is conventional in the art to have a first cell in which the first upper electrode (242) and the first lower electrode (241 and 263) are electrically connected in parallel with first sources/drains of the first transistor (230) is electrically connected in series with a second cell in which the second upper electrode (242) and the second lower electrode (241 and 263) are electrically connected in parallel with second sources/drains the second transistor (230) (see figs. 1-2, col. 1, lines 22-57).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the device of Kawahara et al. with a first cell in which the first upper electrode and the first lower electrode are electrically connected in parallel with first sources/drains of the first transistor is electrically connected in series with a second cell in which the second upper electrode and the second lower electrode are electrically connected in parallel with second sources/drains the second transistor for using in a desire application.

With respect to claim 6, Jacob et al. further discloses that a first contact (285) provided adjacent to the first upper electrode to electrically connect the first upper electrode (241, 263) and one of the first sources/drains; and a second contact (286) provided adjacent to the second upper electrode (242) to electrically connect the second upper electrode (242) and one of the second sources/drains (see fig. 2).

With respect to claim 8, Kawahara et al. discloses that the first upper electrode (63) covers the first lower electrode (65), and the second upper electrode (63) covers the second lower electrode (65) (see fig. 29).

Allowable Subject Matter

7. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to disclose a first insulating film formed on the first transistor and the semiconductor substrate and having a groove with curved sides, and wherein the first ferro-electric capacitor is provided in the groove.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoai v. Pham whose telephone number is 571-272-1715. The examiner can normally be reached on M-F.
10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.
11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


HOAI PHAM
PRIMARY EXAMINER